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Patent Claims

1.) Method for producing blow-molded plastic hollow bodies, whereby a moldable, hot tubular parison blank of a thermoplastic material is extruded from the adjustable circular nozzle of an extruder system and is introduced between the open blow-mold halves of a blow-mold in which, upon closing of the blow-mold, the parison blank is expanded into a finished hollow body with the aid of a gaseous pressure medium (compressed air), while during the extrusion of the parison blank

- the wall thickness of the extruded parison is increased over its length by means of a first control element on the adjustable circular nozzle of the extruder system,
- a partly differing wall thickness of the extruded parison over its circumference is obtained in at least two different longitudinal zones (near the ultimate pinch-off edges perpendicular to the parison) by means of a second control element on the adjustable circular nozzle of the extruder system,

characterized in that

- custom profile contouring in the form of a third thick/thin wall-thickness setting of the extruded parison is obtained at preselectable points along its length and/or its circumference by means of a third control element on the adjustable circular nozzle of the extruder system.

2.) Method as in claim 1,

characterized in that

- the wall thickness of the extruded parison is progressively increased over its length by the slow and progressive widening of the cross section of the nozzle with the aid of the first said control element,
- the wall thickness of the extruded parison in at least two different longitudinal regions (near the ultimate pinch-off edges perpendicular to the parison) is partially increased over its circumference, with the aid of the second control element, by a corresponding enlargement of the cross section of the nozzle, whereby additional plastic material is fed in (no displacement), and
- the thick/thin contouring of the parison wall thickness, producing longitudinal ribs, is obtained with the aid of the third control element by the engagement of an adjustable nozzle gate valve DS II, having a serrated tooth/interstitial-gap profile, for a partial, lateral displacement of the plastic material in the nozzle gap.

3.) Method as in claim 1,

characterized in that

- the wall thickness of the extruded parison is progressively increased over its length by the slow, progressive widening, with the aid of the first control element, of the cross section of the nozzle.
- the wall thickness of the extruded parison in at least two different longitudinal regions (near the ultimate pinch-off edges perpendicular to the parison) is partially increased over its circumference, with the aid of the second control element, by a corresponding enlargement of the cross section of the nozzle, whereby additional plastic material is fed in (no displacement),
- the parison wall thickness is partially increased by means of an additional thickening capability whereby, with the aid of the third control element opening an adjustable nozzle gate valve DS II with a custom-contoured profile, the cross section of the nozzle is partially enlarged so as to feed in additional plastic material (no displacement), forming at least one additional thick spot in at least one preselectable location along the length and/or circumference of the parison.

4.) Device for producing blow-molded plastic hollow bodies, incorporating an extrusion die for extruding a tubular parison blank and an adjustable annular parison exit nozzle with circular nozzle/mandrel-gap control elements (D 0, DS I) which permit a specifically targeted setting of the nozzle gap for modifying the wall thickness of the exiting parison blank,
characterized in that
at least three separate, differently contoured, exchangeable nozzle/nozzle-gap control elements (D 0 = mandrel, DF, DS I, DS II) are provided which, from within and/or from outside the nozzle gap, can be individually and/or simultaneously caused to engage in the extruded parison, with at least two of the control elements (D 0 = mandrel, DS I, DS II) being adjustable for which purpose they are equipped with separate adjustment drives.

5.) Device as in claim 4,
characterized in that
the third, additional control element (DS II) serving to produce a custom-contoured profile (such as a serration or a thick spot) is situated underneath the control element (DS I) and enages in the exiting parison als the last element modulating the wall thickness.

6.) Extrusion die as in claim 4 or 5,
characterized in that
the bottom-most inner edge of the third control element (DS II) which can be engaged in the exiting parison, is positioned at approximately the same level or slightly above the bottom-most outer edge of the central mandrel (D 0).

7.) Hollow body, consisting of a thermoplastic material,

characterized in that

at least in the axial wall regions (in the direction of the parison), multiple, mutually spaced ribs are formed only on the inside of the wall while the outside of the wall retains its uniformly smooth surface.

8.) Hollow body as in claim 7,

characterized in that

mutually neighboring wall zones are of an alternatingly different wall thickness, with the transitions from the thinner to the thicker wall zones and vice versa are formed on the inside of the wall in undulating fashion in a uniformly increasing and decreasing wave pattern.

9.) Hollow body as in claim 7 or 8,

characterized in that

it is produced by the blow-molding method, whereby a tubular parison blank extruded from an extrusion nozzle is expanded in a blow mold, with an appropriate nozzle-control setting progressively and uniformly increasing the wall thickness of the parison blank in its axial direction, while by means of a corresponding nozzle control the parison sections exposed to the highest stress factors are provided with a greater wall thickness for the container regions of the top and bottom panels extending at a 90° angle to the mold-parting plane, and that, by means of an appropriate nozzle control, internal and/or external longitudinal ribs are produced on the tubular parison blank in such fashion that the finished blow-molded container, obtained in a blow-mold with a smooth surface for the lateral or vertical wall sections, is provided with parallel, mutually neighboring, strip-like wall zones of a varying wall thickness at least on the vertical container walls extending in the axial direction.

10.) Hollow body as in claim 7 or 8,

characterized in that

it is produced by the blow-molding method, whereby a tubular parison blank extruded from an annular extrusion nozzle is expanded in a blow-mold, with an appropriate nozzle-control setting progressively and uniformly increasing the wall thickness of the parison blank in its axial direction, while by means of a corresponding nozzle control the parison sections exposed to the highest stress factors are provided with a greater wall thickness for the container regions of the top and bottom panels extending at a 90° angle to the mold-parting plane so as to obtain in the finished blow-molded hollow body a virtually identical wall thickness, and that by means of an appropriate third nozzle control element the parison blank is provided at least in part with an additional augmentation of the wall thickness so as to obtain in the axial or vertical wall of the finished blow-molded hollow body, through the introduction of an additional amount of plastic material, a thick region for instance for a lateral

bung fitting on a plastic fuel container (KKB) or, in the case of an upright-format canister (Fassett), for a lateral handle or carrying-handle attachment.

11.) Hollow body as in claim 7, 8, 9 or 10,
characterized in that
the thicker, strip-shaped wall regions are equally thick and the thinner, strip-shaped wall regions are equally thin.

12.) Hollow body as in one of the preceding claims 7 to 11,
characterized in that
the thinner wall region between two ribs is at least about twice or several times as wide as a rib.

13.) Hollow body as in one of the preceding claims 7 to 12,
characterized in that
the ratio between the height (= wall thickness) of the raised areas A (= rib, wave crest) and the thinner wall regions B (wave trough) is A(H) : B(H) = 1.1 : 1 to 1.5 : 1.

14.) Hollow body as in one of the preceding claims 7 to 13,
characterized in that
the number of ribs for a container diameter of approximately 23" (590 mm) is between 20 and 60 and is preferably about 32.

15.) Hollow body as in one of the preceding claims 7 to 14,
characterized in that
for rectangular containers (such as canisters) each corner is provided with at least one or several ribs, with such ribs preferably extending upwards and/or downwards beyond the vertical wall toward and into the horizontal top and/or, respectively, bottom panels of the container.

16.) Hollow body as in one of the preceding claims 7 to 14,
characterized in that
for rectangular containers (such as canisters) at least one or several ribs are formed into each straight wall section with the exception of the corners, with such ribs preferably extending upwards and/or downwards beyond the vertical wall toward and into the horizontal top and/or, respectively, bottom panels of the container.